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10/582742

JAP20 Rec'd PCT/PTO 13 JUN 2006

**ExxonMobil**

European Patent Office  
Erhardstrasse 27  
D-80469 MÜNCHEN  
GERMANY

18 October 2005

**International Patent Application No PCT/EP 2004/014479**

**ExxonMobil Chemical Patents Inc.**

**Our Ref: 2003B138/WO**

**RESPONSE TO WRITTEN OPINION OF THE ISA AND FILING OF DEMAND**

Dear Sirs,

This communication responds to the Written Opinion of the International Searching Authority that accompanied the International Search Report dated 11 May 2005. In addition we are herewith filing the Demand, together with a Fee Sheet authorising payment of the Demand fee.

The applicants hereby request that a further Written Opinion be issued following substantive examination of the application, bearing in mind the following observations concerning Section V of the Written Opinion.

Where the application is referred to in this communication, reference is made to the text of the application as filed. The application was published on 30 June 2005 with International Publication Number WO 2005/058782 A1.

**Amendments**

We are filing new pages 39-45 which should replace like-numbered pages as currently on file. The new pages constitute a new claim set.

Claim 1 now contains the requirement that the material fed to the first hydrogenation reactor has a sulphur content of below 10 ppm by weight.

Claims 2 and 18 have been made dependent on claim 1 in order to reduce the number of independent claims in the same category. The features that are repetitions of the features of claim 1 have been removed. These amendments do not change the subject matter of claims 2 and 18.

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Filed on 18 Oct 2005 R/C

Claim 5 has been amended to remove the feature now included in claim 1, namely that the sulphur content is below 10 wt. ppm. The preferred feature in original claim 5 (sulphur content below 5 ppm) is now the only feature of amended claim 5.

Claim 42 is now limited to the case where both the sulphur and chlorine levels are required to be below 1 ppm by weight.

There have been no amendments made to any of the claims not specifically mentioned above.

#### **Basis for the amendments in the application as filed**

The feature added to claim 1 finds its basis in the application on page 5, lines 1-3 as well as in claim 5 as originally filed.

The subject matter of amended claims 2 and 18 is not changed by the amendment, so the amended claims 2 and 18 find their basis in the claims 2 and 18 as originally filed.

The defining feature of amended claim 5 finds its basis in original claim 5.

The narrower ranges in claim 42 find basis in the application on page 5, lines 6-9 for sulphur below 1 ppm by weight, and on page 5, lines 19-21 for chlorine below 1 ppm by weight.

#### **Novelty (Art 33(2) PCT)**

Claim 1 is novel over D1 because D1 does not disclose the material fed to the first hydrogenation reactor to have a sulphur content of below 10 ppm by weight. D1 is completely silent about compounds that could affect the hydrogenation catalyst performance other than water, such as sulphur, chlorine, cobalt and rhodium, and which could have been introduced by the upstream processes or because of their presence in the reaction feedstocks or chemicals.

Claim 1 is novel over D2 because D2 does not add water to the material discharged from the first hydrogenation reactor that is to be hydrogenated in the second reactor.

Claim 1 is novel over D3, D4, and D5 individually because the hydrogenation processes disclosed in each of those documents do not involve the addition of water.

The subject matter of claim 1 is therefore novel over the prior art according to Art 33(2) PCT. Claims 2-41 are dependent on claim 1, and are therefore also novel over the prior art.

Claim 42 is novel over D1 because D1 does not specify the sulphur or chlorine content of the olefin mixtures that it discloses.

The olefinic starting materials for hydroformylation disclosed in D1 are typically provided by refinery and/or petrochemical processes, such as catalytic cracking or steamcracking, or are derived therefrom by one of the various forms of oligomerisation named in D1, including dimerisation, trimerisation and tetramerisation, or by metathesis. An alternative source of olefins named in D1 is Fischer-Tropsch synthesis, which utilises synthesis gas derived from a carbon containing source, typically natural gas or a natural gas component, coal or a hydrocarbon liquid. The raw materials for all these processes typically are petroleum feedstocks (see page 1, lines 9-11), which contain sulphur. In some of the conversion processes leading to the olefinic starting materials, sulphur may even be added on purpose to control side reactions. At least a part of the sulphur from these raw materials typically ends up in the products from these processes, and hence, unless specified that this sulphur is removed and to what level, it has to be concluded that the olefin mixtures disclosed in D1 contain an unspecified level of sulphur.

Chlorine is often also present in these raw materials. In addition, certain petrochemical processes, and in particular a number of oligomerisation processes such as the Dimersol® family of processes for the dimerisation of propene and butenes, utilise catalyst systems that contain chlorine, and which are known to introduce more chlorine in the products derived therefrom. Without a specification that chlorine is removed and to what level, it has to be expected that the olefin mixtures disclosed in D1 contain an unspecified level of chlorine.

Claim 42 is novel over D2 because D2 uses propene as the starting material, and does not involve any process that produces an olefin mixture in the C5 to C13 range.

Claim 42 is novel over D3 because D3 does not disclose a mixture of olefins, nor does it give information about sulphur or chlorine levels in the olefins it does disclose.

Claim 42 is novel over D4 because D4 does not disclose information about the carbon number, normal olefin content, sulphur or chlorine level of the alkenes that it uses as the initial products to be converted.

Claim 42 is novel over D5 because the olefin mixtures of D5 are outside the amended claim scope. Thus, D5 provides a process wherein the sulphur content of olefin feedstocks for alcohols is lowered, and the resulting reduced-sulphur feedstock is used to form an alcohol. In some of the examples, the chlorine levels of the feed to the desulphurisation treatment are also disclosed. In Example 2 of D5, the chlorine level of the olefin feed before desulphurisation is <1 ppm, and the sulphur content is 180 ppm. After desulphurisation, the sulphur content of the product is 1 ppm or higher, and the

chlorine level is not disclosed. These olefin mixtures are outside the scope of amended claim 42.

Claim 42 is therefore novel over the prior art according to Art 33(2) PCT. Claim 43 is dependent on claim 42 and is therefore also novel according to Art 33(2) PCT.

Claim 44 is novel over D1 because D1 does not specify the sulphur content nor the chlorine content of the hydrogenation feed stream that it discloses. As submitted above for claim 41, sulphur and/or chlorine is expected to be present in the olefin mixtures disclosed in D1 as starting materials for the aldehydes to be hydrogenated. Additional sulphur and/or chlorine may also be introduced with the syngas, catalyst, chemicals and wash water that is used in hydroformylation or in the catalyst removal step. D1 therefore does not disclose a hydrogenation feed stream as specified by claim 44. It is submitted that claim 44 is therefore novel over D1.

Claim 44 is novel over D2, for the same reasons as stated above with regard to D1. In addition, both the catalyst ligand and the aldolisation catalyst, which is a dilute aqueous alkali hydroxide solution, may bring in more chlorine and sulphur. D2 therefore does not disclose a hydrogenation feed stream as specified by claim 44.

Claim 44 is novel over each of D3 and D4. Both documents are silent about any chlorine and sulphur levels in the aldehyde-comprising hydrogenation feed streams that they disclose. For the reasons submitted above with regard to D1 and D2, chlorine and sulphur may be expected in the hydrogenation feed streams that are disclosed in D3 and D4.

Claim 44 is novel over D5 because D5 does not specify any details about any hydrogenation feed stream derived from the olefin mixtures it discloses.

Claim 44 is therefore not anticipated by the prior art according to Art 33(2) PCT. Claim 45 is dependent on claim 44 and is therefore also novel according to Art 33(2) PCT.

The applicants therefore submit that claims 1-45 as amended are novel according to Art 33(2) PCT.

### Inventive Step

#### Claim 1

D1 is considered the closest prior art to claim 1, because D1 is from the same technical field as the invention, it discloses a process for the production of alcohols comprising the hydroformylation of an olefin or olefin mixture followed by catalytic hydrogenation, wherein water may be added to the hydrogenation reaction, and in order to prevent formation of a second aqueous phase in the hydrogenation reactor and when using a

plurality of reactors connected in series (paragraph 46), the water addition may be carried out before the individual reactors.

The difference between D1 and the process of amended claim 1 is that according to the now-claimed invention the material fed to the first hydrogenation reactor has a sulphur content below 10 ppm by weight. The effect of this difference is that the low sulphur content in the hydrogenation feed stream reduces the damaging effect that sulphur, which is a known poison for many hydrogenation catalysts (page 26, lines 17-18), may have on the hydrogenation reaction. The effect of catalyst poisons such as sulphur is often manifested in a reduction in activity, which results in a reduction of catalyst life. This effect is indirectly sometimes combined with an increased occurrence of side reactions, hence a loss of selectivity and yield (page 1, lines 22-28). In additional to the technical effect of mitigating sulphur damage to the catalyst, the products of the process according to the invention, such as the alcohols that are derived from the hydrogenation product, will contain lower levels of sulphur which will be advantageous in their further use, particularly in the production of derivatives.

The problem to be solved may therefore be stated as one of how, in the process of D1, to provide a way to enhance the life of the hydrogenation catalyst, in case it is poisoned by sulphur.

D5 is from the same technical field and is the only cited document that is concerned with this problem. It proposes as a solution to **reduce the sulphur content of the olefin feedstock delivered to the hydroformylation reaction**. D5 is silent about the composition of the material fed to the hydrogenation reaction. This material may still contain sulphur because sulphur may be introduced by other streams upstream of the hydrogenation reaction, such as by the synthesis gas feed to hydroformylation, or by other streams used in the catalyst removal step. D5 does not teach that the material fed to the **first hydrogenation reactor** should have a sulphur content below 10 ppm by weight. Furthermore, since D5 is only concerned with treatment of olefin feedstocks **prior to the hydroformylation stage** (see col. 1 lines 7-10), it contains nothing to suggest that the sulphur level in feed delivered to the hydrogenation stage should be adjusted; hence nothing that would allow the skilled reader to arrive at the subject matter of claim 1.

The applicants therefore submit that the subject matter of claim 1 involves an inventive step over the prior art according to Art 33(3) PCT. Claims 2-41 depend on claim 1 and therefore also involve an inventive step over the prior art.

#### Claim 42

D5 is considered the closest prior art for the mixture of C5 to C13 olefins claimed in claim 42, because D5 discloses olefin mixtures with about the same carbon number, and it discloses sulphur and chlorine levels of some of these mixtures. Example 2 discloses a feed stream to the desulphurisation step that contains a chlorine level < 1 ppm and a

sulphur content of 180 ppm. Table 5, run number 1 on this feedstock lists a "sulphur content out" of 1 ppm.

The difference between D5 and the subject matter of claim 42 is that the sulphur and chlorine levels in claim 42 are both below 1 ppm by weight. D5 did not explore these extremely low levels of sulphur and chlorine, obviously accepting the conventional wisdom that 1 ppm of a catalyst poison in a stream upstream of a heterogenous catalyst sensitive to that poison, is sufficiently low to be harmless. The applicants however have found that, on its preferred cuprous chrome hydrogenation catalyst, a further reduction of sulphur to below 1 ppm by weight in the olefin feed to hydrogenation followed by hydrogenation, combined with a chlorine content below 1 ppm by weight in that same olefin feed, still has a surprisingly large enhancing effect on the life of the cuprous chrome hydrogenation catalyst.

The objective problem to be solved from D5 is to further enhance the catalyst life of the hydrogenation catalyst downstream of the desulphurisation treatment of D5.

No other document of the cited prior art is concerned with this problem. D5 does not suggest to remove sulphur to below 1 ppm by weight in the olefin. On the contrary, it suggests that 1 ppm of sulphur is sufficiently low when the chlorine level is <1 ppm (Example 2), or that chlorine may be as high as 2 ppm when sulphur is <1 ppm (Example 1). There is therefore no suggestion to arrive at the subject matter of claim 42, which is seen to be a combination of features not envisaged by D5.

The applicants thus submit that claim 42 involves an inventive step over the prior art according to Art 33(3) PCT. Claim 43 depends on claim 42 and is therefore also not obvious over the prior art.

#### **Claim 44**

D1 and D2 both disclose a hydrogenation feed stream comprising aldehydes. Neither D1 nor D2 discloses the sulphur or chlorine content of their respective streams. It has been argued above under novelty that these hydrogenation feed streams may contain sulphur and/or chlorine at an unspecified level.

The difference between the hydrogenation feed streams of D1 and D2 on one hand, and the subject matter of claim 44 on the other hand, is that the claimed stream contains no more than 10 wt. ppm of sulphur and no more than 10 wt. ppm of chlorine.

The effect of this difference is an enhanced life of the catalyst in the hydrogenation process, in particular when this catalyst is cuprous chrome.

The problem to be solved may be stated as one of how to provide this effect of an enhanced life of the cuprous chrome hydrogenation catalyst. D5 is concerned with this

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problem, and proposes as a solution to reduce the sulphur content of the olefin feed to hydroformylation. Because sulphur and chlorine may be introduced into the process between the proposed desulphurisation treatment and the hydrogenation step, such that it ends up in the hydrogenation feed stream, D5 does not inherently propose that the hydrogenation feed stream derived from the olefins with the reduced sulphur level of D5 will have the sulphur and chlorine levels as specified in claim 44. There is therefore no proposal in D5 to arrive at the subject matter of claim 44.

The applicants thus submit that claim 44 involves an inventive step over the prior art according to Art 33(3) PCT. Claim 45 depends on claim 44 and is therefore also not obvious over the prior art.

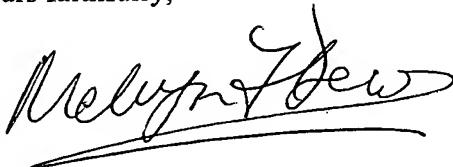
### Summary

The applicants submit that, for the reasons given above, the claimed invention is clearly defined, novel and inventive.

The applicants hereby request that any further Written Opinion to be issued by the IPEA takes account of the above arguments.

Please return Form 1037 to acknowledge receipt.

Yours faithfully,



Dew, Melvyn John  
General Authorisation Number 11495

Encl.: Demand  
Fee Sheet  
Form 1037

**CLAIMS**

1. A process for the production of alcohols comprising the hydroformylation of an olefin or olefin mixture followed by catalytic hydrogenation, wherein the hydrogenation is performed in a series of at least two reactors and water is added to the material discharged from the first reactor that is to be hydrogenated in the second reactor, in an amount such that in the second reactor, all the water present is dissolved in the organic phase and wherein the material fed to the first hydrogenation reactor has a sulphur content of below 10 ppm by weight.
2. A process according to claim 1 wherein water is added to the hydroformylation reactor, no further water is added in the first hydrogenation reactor and water is added to the second hydrogenation reactor.
3. The process according to claim 1 or 2 in which water is carried over from the hydroformylation reactor or a demetalling or washing step downstream of the hydroformylation reactor, into the first hydrogenation reactor, the amount of water carried over being such that all the water present in the first hydrogenation reactor is dissolved in the organic phase to be hydrogenated in the first hydrogenation reactor.
4. The process according to claim 3 in which further water is added to the material entering the second hydrogenation reactor, the amount of water added being such that all the water present in the second reactor is dissolved in the organic phase to be hydrogenated therein.
5. The process according to any of the preceding claims in which the sulphur content of the feed to the first hydrogenation reactor is below 5 wt. ppm.

6. The process according to any of the preceding claims in which the olefin or olefin mixture used for hydroformylation has a sulphur content below 10 wt. ppm, preferably below 5 ppm, more preferably below 1 ppm.
7. The process according to any of the preceding claims in which the chlorine content of the feed to the first hydrogenation reactor is below 10 wt. ppm, preferably below 5 ppm.
8. The process according to any of the preceding claims for the production of C<sub>6</sub> to C<sub>15</sub> alcohols from C<sub>5</sub> to C<sub>14</sub> olefins or olefin mixtures.
9. The process according to any of the preceding claims in which the hydroformylation is performed at elevated temperatures and pressures using a cobalt catalyst.
10. The process according to claim 9 in which cobalt species are removed from the product of hydroformylation prior to hydrogenation in the first hydrogenation reactor.
11. The process according to claim 9 or 10 in which the product of hydroformylation is treated to remove cobalt species so that the cobalt content is below 2 wt. ppm prior to hydrogenation.
12. The process according to any of the preceding claims in which the hydroformylation is performed at pressures from 50 to 350 barg, preferably 150 to 350 barg, most preferably from 275 to 325 barg and temperatures from 165 to 185°C preferably from 170 to 180°C.
13. The process according to any of the preceding claims in which the hydroformylation reaction is performed in a series of at least two reactors.

14. The process according to any of the preceding claims in which the gas composition in the hydroformylation reactor(s) is controlled by recycle of unreacted gasses from hydroformylation.
15. The process according to claim 13 or 14 wherein the hydrogen level in the second (and any subsequent) hydroformylation reactor(s) is replenished by balancing the composition of recycle gasses and/or by introducing unreacted gasses from the downstream hydrogenation reactor used to convert aldehydes in the final product of hydroformylation into alcohols.
16. The process according to claim 13, 14 or 15 in which a series of at least three hydroformylation reactors is used, and a hydrogen rich gas, comprising recycle gas from the hydroformylation reaction and/or from the downstream hydrogenation section, is fed to the third reactor.
17. The process according to any of the preceding claims in which the hydroformylation catalyst is cobalt and cobalt catalyst species are removed by injection of base such as caustic soda and/or sodium carbonate into the reaction product in a decobalter vessel following the final hydroformylation reactor.
18. The process according to claim 1 or 2 further comprising the aldolisation of at least a portion of the aldehyde or aldehyde mixture produced in hydroformylation, and catalytic hydrogenation of at least a portion of the aldolisation product.
19. The process according to claim 18 in which water is carried over from the aldolisation reactor into the first hydrogenation reactor, the amount of water carried over being such that all the water present in the first hydrogenation reactor is dissolved in the organic phase to be hydrogenated in the first hydrogenation reactor.

20. The process according to claim 19 in which further water is added to the material entering the second hydrogenation reactor, the amount of water added being such that all the water present in the second reactor is dissolved in the organic phase to be hydrogenated therein.
21. The process according to any of claims 18 to 20 wherein the olefin or olefin mixtures comprises C<sub>2</sub> to C<sub>4</sub> olefins.
22. The process according to claim 21 using rhodium hydroformylation catalyst.
23. The process according to claim 21 or 22 using a phosphorus ligand in its hydroformylation reactor.
24. The process according to claim 23 wherein the phosphorus ligand is triphenylphosphine.
25. The process according to claim 23 wherein the phosphorus ligand is an organic phosphite.
26. The process according to claim 25 wherein the organic phosphite is 6,6'-[[3,3',5,5'-tetrakis(1,1-dimethylethyl)-1,1'-biphenyl]-2,2'-diyl] bis(oxy)] bis-dibenzo [d,f] [1,3,2]-dioxaphosphepin.
27. The process according to any of claims 21 to 26 wherein a C<sub>8</sub> alcohol is produced from propylene.
28. The process according to any of claim 21 to 26 wherein a C<sub>9</sub> alcohol is produced from ethylene.

29. The process according to any of claims 21 to 26 wherein a C<sub>10</sub> alcohol or alcohol mixture is produced from butene or from a butene mixture.
30. The process according to any of the preceding claims in which the hydrogenation catalyst is a cuprous chrome catalyst.
31. The process according to claim 30 in which the hydrogenation catalyst contains from 20% to 40% by weight of each of copper and chromium based on the total weight of hydrogenation catalyst including any support, preferably from 25% to 35% of each of copper and chromium, more preferably from 28% to 32% of each of copper and chromium, most preferably 29% to 31% of each of copper and chromium.
32. The process according to any of claims 1 to 29 in which the hydrogenation catalyst comprises a monometallic or bimetallic or trimetallic catalyst composition on a solid support.
33. The process according to claim 32 wherein the support is selected from alumina or silica-alumina or a carbonaceous support.
34. The process according to claim 33 wherein the catalyst composition further comprises an acidity modifier.
35. The process according to claim 34 wherein the acidity modifier comprises a member of Group IA or IIA of the Periodic Table of the Elements.
36. The process according to claim 35 wherein the acidity modifier comprises magnesium, sodium or potassium, or a compound containing magnesium, sodium or potassium.

37. The process according to any of claims 1 to 29 in which the catalytic hydrogenation uses a transition metal hydrogenation catalyst dissolved in an ionic liquid.
38. The process according to claim 37 wherein the transition metal is selected from nickel, cobalt, copper, palladium, chromium, ruthenium and rhodium, or a mixture of any two or more thereof.
39. The process according to claim 37 or 38 wherein the ionic liquid comprises in combination a first component selected from  $[BF_4]^-$ , halide anions,  $[PF_6]^-$ ,  $[CF_3COO]^-$ , and  $[SbF_6]^-$ , and a second component selected from  $[emim]^+$ ,  $[bmim]^+$ , any other disubstituted imidazolium, the substituents being C1-C4 alkyl, or  $[NBuPy]^+$  or another suitable alkylammonium cation.
40. The process according to any of the preceding claims in which the product from the first hydrogenation reactor passes in a line to the second hydrogenation reactor and water is injected into the line and the mixture passes to a mixer whereby the water and the product are mixed so that the water is dissolved and/or entrained in the product, and the mixture is then passed to the second hydrogenation reactor where it passes through a catalyst bed at a temperature of 170 to 190°C at a hydrogen pressure of 40 to 200 barg.
41. The process according to claim 40 in which from 1 to 2 wt % of water based on the weight of organic material is injected.
42. A mixture of C<sub>5</sub> to C<sub>13</sub> olefins comprising at most 90 mol % of normal olefins, which mixture is useful in the production of alcohols by hydroformylation of the olefin mixture followed by hydrogenation, said olefin mixture containing below 1 ppm sulphur by weight, preferably below 0.1 ppm, and below 1 ppm chlorine by weight, preferably below 0.1 ppm.

43. The olefin mixture according to claim 42 wherein more than 50 wt. % of the mixture comprises C<sub>8</sub> olefins.
44. A hydrogenation feed stream comprising aldehydes containing from 6 to 15 carbon atoms useful in the production of alcohols by hydrogenation, said hydrogenation feed stream containing no more than 10 wt. ppm, preferably no more than 5 ppm and more preferably no more than 1 ppm, most preferably below 0.1 ppm, sulphur and no more than 10 wt. ppm, preferably no more than 5 ppm, and more preferably no more than 1 ppm, most preferably below 0.1 ppm chlorine.
45. The hydrogenation feed stream according to claim 44 comprising aldehydes containing nine carbon atoms, useful in the production of C<sub>9</sub> alcohols.

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EP

# PCT

## CHAPTER II

### DEMAND

under Article 31 of the Patent Cooperation Treaty:

The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only

|   |   |   |
|---|---|---|
| Identification of IPEA  |   | Date of receipt of DEMAND   |
| <b>Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION</b>  |   |   |
| International application No.<br>PCT/EP2004/014479  | International filing date (day/month/year)<br>16 December 2004 (16/12/2004) | Applicant's or agent's file reference<br>2003B138<br>(Earliest) Priority date (day/month/year)<br>18 December 2003 (18/12/2003) |
| Title of invention<br><b>IMPROVEMENTS IN OR RELATING TO HYDROGENATION</b>   |   |   |
| <b>Box No. II APPLICANT(S)</b>  |   |   |
| Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)<br><br>ExxonMobil Chemical Patents Inc.<br>5200 Bayway Drive<br>Baytown, TX 77520-5200<br>United States of America |   | Telephone No.<br><br>Facsimile No.<br><br>Teleprinter No.<br><br>Applicant's registration No. with the Office                   |
| State (that is, country) of nationality:<br>US  | State (that is, country) of residence:<br>US                                |   |
| Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)<br><br>VAN DRIESSCHE, Eddy<br>Krekelmuit 8<br>9900 Eeklo<br>Belgium  |   |   |
| State (that is, country) of nationality:<br>BE  | State (that is, country) of residence:<br>BE                                |   |
| Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)<br><br>BUESS, Philippe L.<br>Marnixlaan 89<br>3090 Overijse<br>Belgium   |   |   |
| State (that is, country) of nationality:<br>BE  | State (that is, country) of residence:<br>BE                                |   |
| <input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.   |   |   |

**Continuation of Box No. II APPLICANT(S)**

*If none of the following sub-boxes is used, this sheet should not be included in the demand.*

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**Continuation of Box No. II APPLICANT(S)***If none of the following sub-boxes is used, this sheet should not be included in the demand.*Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

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 USA

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**US**

State *(that is, country) of residence:*  
**US**

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State *(that is, country) of nationality:*

State *(that is, country) of residence:*

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

State *(that is, country) of nationality:*

State *(that is, country) of residence:*

Further applicants are indicated on another continuation sheet.

**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The following person is  agent  common representative

and  has been appointed earlier and represents the applicant(s) also for international preliminary examination.

is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.

is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: (*Family name followed by given name; for a legal entity, full official designation.  
The address must include postal code and name of country.*)

DEW, Melvyn John  
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Agent's registration No. with the Office  
11495

Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:\***

1. The applicant wishes the international preliminary examination to start on the basis of:

the international application as originally filed

the description  as originally filed

as amended under Article 34

the claims  as originally filed

as amended under Article 19 (together with any accompanying statement)

as amended under Article 34

the drawings  as originally filed

as amended under Article 34

2.  The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3.  Where the IPEA wishes to start the international preliminary examination at the same time as the international search in accordance with Rule 69.1(b), the applicant requests the IPEA to postpone the start of the international preliminary examination until the expiration of the applicable time limit under Rule 69.1(d).

4.  The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54bis.1(a).

\* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English .....

which is the language in which the international application was filed.

which is the language of a translation furnished for the purposes of international search.

which is the language of publication of the international application.

which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

**Box No. V ELECTION OF STATES**

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT.

**Box No. VI CHECK LIST**

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

|  |   |          | reserved                 | not received             |
|--|---|----------|--------------------------|--------------------------|
| 1. translation of international application                              | : | sheets   | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. amendments under Article 34   | : | 7 sheets | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets   | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. copy (or, where required, translation) of statement under Article 19  | : | sheets   | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. letter  | : | sheets   | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. other (specify) Form 1037   | : | 2 sheets | <input type="checkbox"/> | <input type="checkbox"/> |

The demand is also accompanied by the item(s) marked below:

- fee calculation sheet
  - original separate power of attorney
  - original general power of attorney
  - copy of general power of attorney; reference number, if any:
  - statement explaining lack of signature
  - sequence listing in electronic form
  - tables in electronic form related to a sequence listing
  - other (specify): Response to ISA Written Opinion

**Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE**

*Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).*

DEW, Melvyn John  
GA No 11495

For International Preliminary Examining Authority use only

- 1. Date of actual receipt of DEMAND:**

- 2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):**

3.  The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

The applicant has been informed accordingly.

4.  The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.

5.  Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

6.  The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54bis.1(a) and item 7 or 8, below, does not apply.

7.  The date of receipt of the demand is WITHIN the time limit under Rule 54bis.1(a) as extended by virtue of Rule 80.5.

8.  Although the date of receipt of the demand is after the expiration of the time limit under Rule 54bis.1(a), the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

**Demand received from IPEA on:**

**PCT****FEE CALCULATION SHEET****Annex to the Demand**

|   |                          |  |
|---|--------------------------|--|
| International application No.           | <b>PCT/EP2004/014479</b> | For International Preliminary Examining Authority use only |
| Applicant's or agent's file reference   | <b>2003B138</b>          | Date stamp of the IPEA                                     |
| Applicant                               |                          |  |
| <b>ExxonMobil Chemical Patents Inc.</b> |                          |  |

**CALCULATION OF PRESCRIBED FEES**

|   |                |              |       |
|---|----------------|--------------|-------|
| 1. Preliminary examination fee .....  | <b>1530.00</b> | <b>P</b>     | ..... |
| 2. Handling fee ( <i>Applicants from certain States are entitled to a reduction of 75% of the handling fee. Where the applicant is (or all applicants are) so entitled, the amount to be entered at H is 25% of the handling fee.</i> ) ..... | <b>129.00</b>  | <b>H</b>     | ..... |
| 3. Total of prescribed fees<br><i>Add the amounts entered at P and H and enter total in the TOTAL box .....</i>   | <b>1659.00</b> | <b>TOTAL</b> | ..... |

**MODE OF PAYMENT**

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> authorization to charge deposit account with the IPEA (see below) | <input type="checkbox"/> cash                            |
| <input type="checkbox"/> cheque   | <input type="checkbox"/> revenue stamps                  |
| <input type="checkbox"/> postal money order   | <input type="checkbox"/> coupons                         |
| <input type="checkbox"/> bank draft   | <input type="checkbox"/> other ( <i>specify</i> ): _____ |

**AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT ACCOUNT***(This mode of payment may not be available at all IPEAs)*IPEA/ EP Authorization to charge the total fees indicated above.Deposit Account No.: 28300203 (*This check-box may be marked only if the conditions for deposit accounts of the IPEA so permit*) Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.Date: 18 October 2005Name: DEW, Melvyn JohnSignature: Melvyn J Dew